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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Database Data Translation Database Management Systems Program Translation Data Models Conceptual Schema Network Models Relational Models (DBMS)		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) DBMS are now well established as a tool for information system implementation. However, the debates over relational and network systems, and subsequent research have underlined the need to both provide new systems with both capabilities as well as to understand the theoretical aspects which will make standardization possible. The reported research is intended to foster such an approach.		

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PROBLEMS IN THE TRANSLATION AND STANDARDIZATION OF
RELATIONAL AND NETWORK TYPE DATA BASE MANAGEMENT SYSTEMS

FINAL REPORT

DR. E. H. SIBLEY, UNIVERSITY OF MARYLAND

SEPTEMBER 14, 1977

U.S. ARMY RESEARCH OFFICE

ARO GRANT ARO-DAAG-29-76-G-0300

DEPARTMENT OF INFORMATION SYSTEMS MANAGEMENT
UNIVERSITY OF MARYLAND
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CONSTRUED AS AN OFFICIAL DEPARTMENT OF THE
ARMY POSITION, UNLESS SO DESIGNATED BY
OTHER AUTHORIZED DOCUMENTS.

1. Statement of Problem

The proposal suggested that there were three important goals that should be achieved to improve the DBMS standards process:

- i) Develop a good understanding of the similarities of (at least) the relational and network (CODASYL) approaches.
- ii) Show how these (and possibly other) data modelling methods can be expressed in a common (mathematical) framework, as well as show how DDL statements affect DML constructs.
- iii) Provide, based on this work, suggested modifications to the proposed standards to ensure better products.

During one year of funding, it was proposed that a generalized model facility be investigated, using an extended set model, and that a relational system be modelled within this general model. Furthermore, that the investigators would remain current with standards and developmental efforts.

2. Statement of Important Results

During the year, the extended set theoretic model has been modified into a methodology termed: positional set processing (PSP); this has been further extended to allow a data definitional facility within the framework of the PSP (and given the acronym PSP/D).

Attempts have been made to formulate (or reformulate) the relational data model within the framework of PSP/D. This has led to one technical report dealing specifically with this topic. Furthermore, an attempt was made to find whether the functional model was as powerful as, and had any advantages over, the PSP approach: this also led to a paper published at NCC-1977 (National Computer Conference).

Finally, an attempt was made, in conjunction with other funds, to explain the philosophy of the PSP/D and to show how it could model also the graph (CODASYL-type) data system and Senko's FORAL. Although this work is preliminary, it has also been discussed in a recent technical report.

3. Technical Reports

The following reports are available in published form:

- I. Data Architecture and Data Model Considerations. E.H. Sibley and L. Kerschberg, Proceedings NCC-1977, pp. 85-96.
- II. Data Model Theory: A Beginning. J.B. Rothnie and W.T. Hardgrave, Proceedings 1976 Texas Conference, pp. 13.

The following reports are available but have not (as yet) been submitted for publication:

- III. The Relational Model: A Reformulation of Some Mathematical Aspects. W.T. Hardgrave, T.R. #25, Department of Information Systems Management, University of Maryland.

Technical Reports continued.

- IV. Data Model Theory and Positional Set Processing. E.H. Sibley and W.T. Hardgrave, to be presented at an NSF joint USSR/USA workshop in Moscow, November, 1977, draft copies now available, 65 pages.

4. Personnel

The principal investigator was Dr. Edgar H. Sibley, Professor and Acting Chairman of the Department of Information Systems Management. Dr. W.T. Hardgrave, an assistant professor of the Department of Information Systems Management, was a major contributor in the effort. Two faculty research assistants (Ms. B.F. Zager and Mr. J.E. Perkins) provided technical and allied support.

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